

What is claimed is

1. An apparatus for checking validity of a code-group comprising:
  - a 6B/5B disparity classification unit which receives an 8B/10B code-group, classifies the least significant 6-bit nibble of the received 8B/10B code-group, and outputs the characteristic information of the disparity;
  - a 4B/3B disparity classification unit which classifies the most significant 4-bit nibble of the received 8B/10B code-group and outputs the characteristic information of the disparity;
  - an RD6 detection unit which receives the running disparity of a previously received 8B/10B code-group and the disparity classification characteristic information of the least significant 6-bit nibble, and generates the running disparity of the least significant 6-bit nibble of the 8B/10B code-group;
  - an RD4 detection unit which receives the running disparity of the least significant 6-bit nibble output from the RD6 detection unit and the disparity classification characteristic information of the most significant 4-bit nibble, and generates the running disparity of the most significant 4-bit nibble of the 8B/10B code-group;
  - an 8B/10B line code rule violation detection unit which detects whether or not the received 8B/10B code-group violates a predetermined line code rule;
  - an RD error detection unit which receives the disparity classification characteristic information of the least significant 6-bit nibble, the disparity classification characteristic information of the most significant 4-bit nibble, the running disparity of the previously received 8B/10B code-group, and the running disparity of the least significant 6-bit nibble output from the RD6 detection unit, and detects a running disparity error of the least significant 6-bit nibble and an error of the most significant 4-bit nibble of the 8B/10B code-group; and
  - a unit which receives and combines the output signal of the 8B/10B line code rule violation detection unit and the error signal of the RD error detection unit, and outputs whether or not the received 8B/10B code-group is valid.
2. The apparatus of claim 1, wherein the 6B/5B disparity classification unit receives the 8B/10B code-group, and outputs signal P2ND6

indicating that the disparity of the least significant 6-bit nibble is a positive value, signal N2PD6 indicating that the disparity of the least significant 6-bit nibble is a positive value, signal P2LD6 indicating that data of the least significant 6-bit nibble is "000111" and signal N2LD6 indicating that data of the least significant 6-bit nibble is "111000".

3. The apparatus of claim 2, wherein if the signal P2ND6 is 1, the RD6 detection unit outputs 0 irrespective of other input values, if the signal N2PD6 is 1, outputs 1, and if the signal P2ND6 is 0 and the signal N2PD6 is 0, receives the running disparity of the previously received 8B/10B code-group and outputs the running disparity as is.

4. The apparatus of claim 1, wherein the 4B/3B disparity classification unit receives the 8B/10B code-group, and outputs signal P2ND4 indicating that the disparity of the most significant 4-bit nibble is a negative value, signal N2PD4 indicating that the disparity of the most significant 4-bit nibble is a positive value, signal P2LD4 indicating that data of the most significant 4-bit nibble is "0011" and signal N2LD4 indicating that data of the most significant 4-bit nibble is "1100".

5. The apparatus of claim 4, wherein if the signal P2ND4 is 1, the RD4 detection unit outputs 0 irrespective of other input values, if the signal N2PD4 is 1, outputs 1, and if the signal P2ND4 is 0 and the signal N2PD4 is 0, receives the running disparity output from the RD6 detection unit and outputs the running disparity as is.

6. The apparatus of claim 1, wherein the RD error detection unit detects a running disparity error of the least significant 6-bit nibble and a running disparity error of the most significant 4-bit nibble of the 8B/10B code-group, and if any one of the error types occurs, determines that there is an error and outputs an error signal.

7. The apparatus of claim 1, wherein the unit for outputting whether or not the received 8B/10B code-group is valid performs OR operation of the error signal of the RD error detection unit and the output signal of the 8B/10B line code rule violation detection unit and outputs the result.

5

8. A method for checking validity of a code-group comprising:

(a) receiving an 8B/10B code-group, classifying the least significant 6-bit nibble of the received 8B/10B code-group, and outputting the characteristic information of the disparity;

10 (b) classifying the most significant 4-bit nibble of the received 8B/10B code-group and outputting the characteristic information of the disparity;

(c) receiving the running disparity of a previously received 8B/10B code-group and the disparity classification characteristic information of the least significant 6-bit nibble, and generating the running disparity of the least significant 6-bit nibble of the 8B/10B code-group;

(d) receiving the running disparity of the least significant 6-bit nibble output in step (c) and the disparity classification characteristic information of the most significant 4-bit nibble, and generating the running disparity of the most significant 4-bit nibble of the 8B/10B code-group;

20 (e) detecting whether or not the received 8B/10B code-group violates a predetermined line code rule;

(f) receiving the disparity classification characteristic information of the least significant 6-bit nibble, the disparity classification characteristic information of the most significant 4-bit nibble, the running disparity of the previously received 8B/10B code-group, and the running disparity of the least significant 6-bit nibble output in step (c), and detecting a running disparity error of the least significant 6-bit nibble and an error of the most significant 4-bit nibble of the 8B/10B code-group; and

25 (g) receiving and combining the output signal of step (e) and the error signal of step (f), and outputting whether or not the received 8B/10B code-group is valid.

9. The method of claim 8, wherein in step (a), the 8B/10B code-group is received and signal P2ND6 indicating that the disparity of the least significant 6-bit nibble is a positive value, signal N2PD6 indicating that the disparity of the least significant 6-bit nibble is a positive value, signal P2LD6  
5 indicating that data of the least significant 6-bit nibble is "000111" and signal N2LD6 indicating that data of the least significant 6-bit nibble is "111000" are output.

10. The method of claim 8, wherein in step (c) if the signal P2ND6  
10 is 1, 0 is output irrespective of other input values, if the signal N2PD6 is 1, 1 is output, and if the signal P2ND6 is 0 and the signal N2PD6 is 0, the running disparity of the previously received 8B/10B code-group is received and output as is.

15 11. The method of claim 11, wherein in step (b), the 8B/10B code-group is received, and signal P2ND4 indicating that the disparity of the most significant 4-bit nibble is a negative value, signal N2PD4 indicating that the disparity of the most significant 4-bit nibble is a positive value, signal P2LD4 indicating that data of the most significant 4-bit nibble is "0011" and signal  
20 N2LD4 indicating that data of the most significant 4-bit nibble is "1100" are output.

12. The method of claim 11, wherein in step (d) if the signal P2ND4  
25 is 1, 0 is output irrespective of other input values, if the signal N2PD4 is 1, outputs 1, and if the signal P2ND4 is 0 and the signal N2PD4 is 0, the running disparity output in step (c) is received and output as is.